



AIR DEFENSE BALLISTIC MISSILE DEFENSE CIVIL DEFENSE

Whole World on Fire—And All Wet

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I have just finished reading a strange book, *Whole World on Fire*, by Lynn Eden, published by Cornell University Press a month ago. Ms. Eden is an historian at Stanford University. Her thesis is that Air Force targeteers perversely continued to use blast damage as the basis for targeting even though fire damage "would extend two to five times farther than blast damage" because of institutional biases stemming from the emphasis on precision bombing in World War II. That is, "organizations draw on past practices and ideas even as they innovate to solve new problems."

To Ms. Eden, the question of prioritizing nuclear weapon effects is just a convenient example of this institutional characteristic. She does not purport herself to be an expert on the physics of mass fires. This helps explain part of the strangeness I find in the book; namely, Why now? After all, the Cold War is over and targeteers are not fine-tuning the SIOP. It seems she has spent 15 years reviewing the literature on nuclear fires, interviewing the knowledgeable people and writing the book. It just happened to come out now.

In Chapter 1, Ms. Eden introduces her readers to the problem by postulating the detonation of a 300-kt bomb 1,500 feet above the Pentagon. It is here that I encounter more of the strangeness. It seems that Ms. Eden is under some pressure to convince her readers that the Air Force had plainly ignored the obvious. Therefore, she tends to present the most extreme positions on mass fire issues, as well as some of the "tricks of the trade." One trick: close in, we are told "the fireball would melt asphalt in the streets." But when the description gets to the Capitol building some three miles away, there is no comparable sentence. The previous image is permitted to carry over.

Next, we are told, "Even though the Capitol is well constructed to resist fire, and stands in an open space at a distance from other buildings, light from the fireball shining through the building's windows would ignite papers, curtains, light fabrics, and some furniture coverings. Large sections of the building would probably suffer heavy fire damage. The House and Senate office buildings would suffer even greater damage. The interiors of these buildings would probably burn."

Hold on! Wait a minute! The Capitol building is completely protected by sprinklers. So are the House and Senate office buildings, the Library of Congress, the Supreme Court building, and the massive buildings lining the Mall and in the Federal Triangle. These buildings may become sopping wet but they probably will not burn. The monuments also will not burn.

Why don't mass fire calculators take sprinkler systems, venetian and vertical blinds, and other fire protection measures into account? Is the situation in the Nation's Capital unusual? Not anymore. For decades, the lowly fire protection engineer and his employer, the fire insurance industry, have been gnawing away at the fire problem. According to the National Fire Protection Association, between 1977 and 2002 the annual number of building fires in the United States declined by 50%, from 3.2 million a year to 1.6 million a year. Fires in hotels and motels, which killed over 100 people a year as recently as the late 1960s, have become so rare that the U.S. Fire Administration no longer keeps statistics on them. If it were not for a sizable

increase in wildfire damage—resulting from timber management practices—the statistics would look even better.

Ultimately, Ms. Eden concludes, "Within tens of minutes, the entire area, approximately 40 to 65 square miles—everything within 3.5 or 4.6 miles of the Pentagon—would be engulfed in a mass fire. The fire would extinguish all life and destroy almost everything else." To reach this horrific prediction, Ms. Eden has to ignore more than the prevalence of sprinkler systems. Among these other issues are the hole in the doughnut problem and the survivability problem.

I was introduced to the hole in the doughnut issue in 1963 when I first visited UK civil defense in the Home Office, Horseferry House, London. I discovered that the people I was talking to had planned the incendiary attacks during World War II. Their effectiveness depended on how many explosive bombs they included in an attack. If they included too many, the buildings were knocked down and didn't burn well. In fact, the target just smoldered. If they included too few, the incendiaries often just burned out on undamaged roofs. Finally, in the Hamburg attack, they got it right, just opening up the buildings so they burned rapidly. The Hamburg mass fire was called a "fire storm." These people were adamantly unanimous that a nuclear weapon could never cause a firestorm. The severe-damage region around the explosion would just smolder, producing a "ring fire," called a doughnut by our fire research people. That's apparently what happened at Hiroshima.

Mass fire models that ignore such views produce fierce fires that would seem to destroy everything. But lots of people survived in the fire areas at Hamburg and Hiroshima. The late Dr. Carl F. Miller (after whom the California chapter of ASDA is named) did the definitive analysis of the records of the Hamburg Fire Department. About 20 percent of the people in the fire area were in underground bunkers. Eighty percent were in shelters in building basements. Survival in bunkers was 100%; in basements, it was 80%.

Despite her exaggeration of mass fire effects, I don't think Ms. Eden's book would convince the joint strategic targeteers to change their ways. I have concluded that the blast footprint and the fire footprint will be roughly congruent. Thus, I refer to them simply as the "direct effects area" (See my *Nuclear Emergency Operations 101*.)

Lynn Eden's book is a strange book—and a little bit dumb (her term.) I wouldn't recommend you buy it. But if you are part of the old civil defense research group, you should find the pages on that work interesting. If you just want to learn something about mass fires, try to find a copy of FEMA H-21 of August 1990, the Nuclear Attack Environment Handbook. It won't lead you astray.